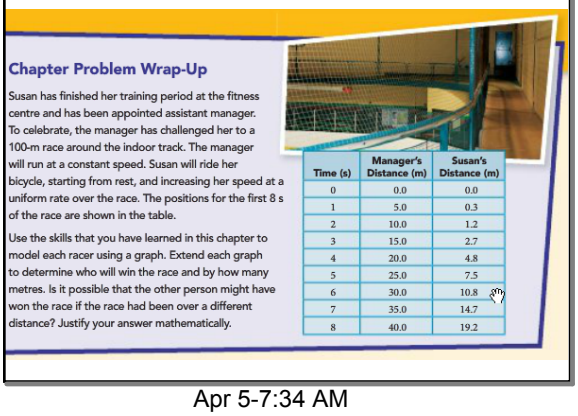
Chapter 5 Review

Please Complete p332- 333
q. 1-8

Chapter Problem Wrap-up p.335



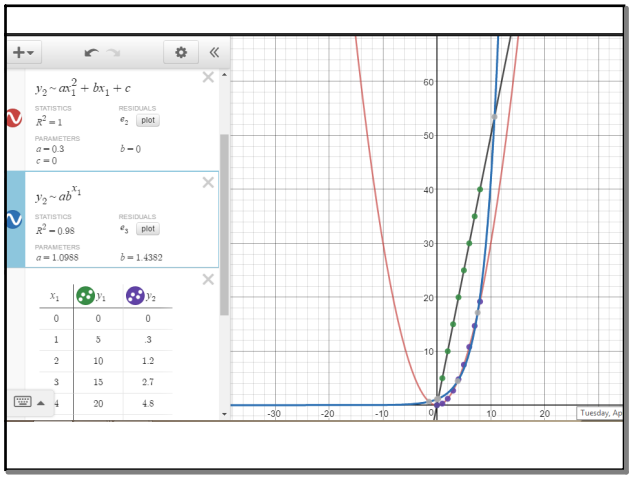
Chapter Problem Wrap-Up

Susan has finished her training period at the fitness centre and has been appointed assistant manager. To celebrate, the manager has challenged her to a 100-m race around the indoor track. The manager will run at a constant speed. Susan will ride her bicycle, starting from rest, and increasing her speed at a uniform rate over the race. The positions for the first 8 s of the race are shown in the table.

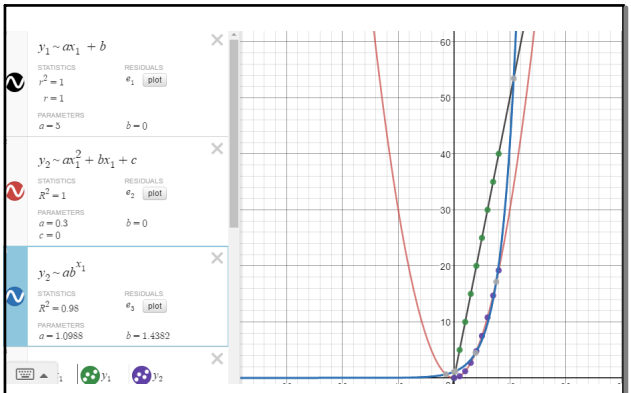
Use the skills that you have learned in this chapter to model each racer using a graph. Extend each graph to determine who will win the race and by how many metres. Is it possible that the other person might have won the race if the race had been over a different distance? Justify your answer mathematically.

Time (s)	Manager's Distance (m)	Susan's Distance (m)
0	0.0	0.0
1	5.0	0.3
2	10.0	1.2
3	15.0	2.7
4	20.0	4.8
5	25.0	7.5
6	30.0	10.8
7	35.0	14.7
8	40.0	19.2

Apr 5-7:34 AM

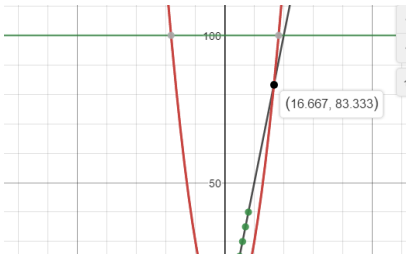


Apr 11-9:53 AM



The biker will win the race by 8.5m. I am 100% confident in my answer.

Apr 11-9:53 AM



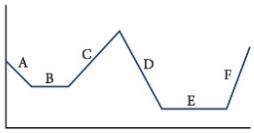
If the race was 83.3 m the athletes would tie, before that the runner will win, after that the biker will win.

Apr 11-10:21 AM

Review Questions

5.1 Linear Models, pages 268-281

1. Consider this graph.



Which parts show

a) a positive rate of change?
b) a negative rate of change?
c) a zero rate of change?

Apr 11-3:09 PM

Review Questions

5.1 Linear Models, pages 268-281

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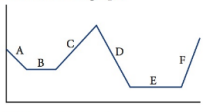

Which parts show

a) a positive rate of change? C F
b) a negative rate of change? A D
c) a zero rate of change? plateau (B E)

Apr 11-3:09 PM

2. The city roads department ordered 2000 m^3 of sand to use on the roads during the winter. The volume of sand at the end of each week is shown.

Week	Volume of Sand (m^3)
0	2000
1	1922
2	1836
3	1755
4	1682
5	1598
6	1520
7	1442
8	1338

a) Describe the relationship between the volume of sand remaining and the week.
b) Create a scatter plot of the data.
c) Add a line of best fit to the graph. Write the equation for the line.
d) Predict how many weeks, in total, the sand will last.

Bookmarks

Apr 11-3:10 PM

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Bookmarks

Apr 11-3:10 PM

$y_1 \sim ax_1 + b$

STATISTICS
$r^2 = 0.999$
$r = -1$

RESIDUALS
e_1 plot

PARAMETERS
$a = -81.283$ $b = 2002.1$

x_1	y_1
0	2000
1	1922
2	1836
3	1755
4	1682
5	1598
6	1520
7	1442
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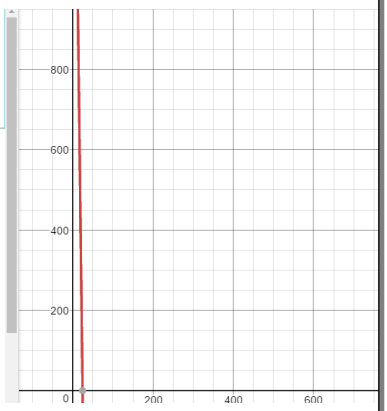

Apr 12-10:00 AM

5.2 Quadratic Models, pages 282-293

3. Is this relation linear, quadratic, or neither? Explain how you know.

x	y
0	45
1	44
2	41
3	36
4	29

Apr 11-3:10 PM

5.2 Quadratic Models, pages 282-293

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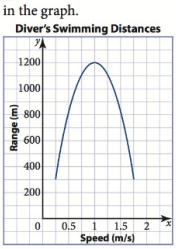
x	y
0	45
1	44
2	41
3	36
4	29

-1 -3 -5 -2
-2 -2 -2

Second differences are the same therefore quadratic.

Apr 11-3:10 PM

4. The distance that a scuba diver can swim on one tank of compressed air and the speed at which she is swimming is shown in the graph.



a) Describe the relation between range and speed in words.
b) Use the graph to estimate the range at a swim speed of 0.5 m/s.
c) What speed appears to result in the maximum range? What is this range?
d) What are appropriate units for the rate of change of range with respect to speed?
e) Is the rate of change of range with respect to speed increasing, constant, or decreasing? Explain.

Apr 11-3:11 PM

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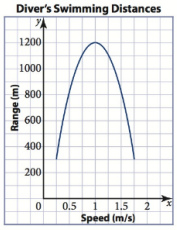

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Apr 11-3:11 PM

5.3 Exponential Models, pages 294-305

5. Avi invested $1000 in a five-year GIC that paid 5% interest per year, compounded annually. Make a table showing the value of the GIC at the end of each year of the term.

$P = 1000$
$i = 0.05$
$n = 5$

$A = P(1+i)^n$
$= 1000(1+0.05)^5$
$= 1000(1.05)^5$
$= 1000(1.276\,28)$
$= 1276.28$

$I = Prt$

Apr 11-3:15 PM

5.3 Exponential Models, pages 294-305

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Apr 11-3:15 PM

6. A magazine article implies that the population of Canada geese in the city has been growing exponentially. The article includes the estimated goose population for the last six years. Does the population growth appear to be exponential? Justify your answer.

Year	Goose Population
1	1190
2	1250
3	1310
4	1380
5	1455
6	1530

$\frac{1530}{1455} = 1.05$

$\frac{1455}{1380} = 1.05$

$\frac{1380}{1310} = 1.05$

Apr 11-3:15 PM

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Apr 11-3:15 PM

5.4 Analyse Graphical Models, pages 310-319

7. The table shows the average yearly electricity consumption per household for a medium-sized city.

Year	Electricity Consumption (kWh)
0	2420
1	2470
2	2520
3	2570
4	2620
5	2670

a) Show that the data can be represented by a linear model and by an exponential model.

b) Use technology to determine a linear and an exponential model. Write the equation for each model.

c) What might the electricity consumption be in 15 years? Which model predicts a higher demand? Explain how you know.

d) Use technology to graph each model. Extend each graph to determine the demand after 15 years.

Apr 11-3:16 PM

5.4 Analyse Graphical Models, pages 310-319

7. The table shows the average yearly electricity consumption per household for a medium-sized city.

Year	Electricity Consumption (kWh)	
0	2420	+50
1	2470	+50
2	2520	+50
3	2570	+50
4	2620	+50
5	2670	

$y = 50x + 2420$
$R = 1.0$

$y_1 \approx -1.52x^2 + 50x + 2420$

$y_2 = 2427(1.02)^x$

$R = 1.0$

a) Show that the data can be represented by a linear model and by an exponential model.

b) Use technology to determine a linear and an exponential model. Write the equation for each model.

c) What might the electricity consumption be in 15 years? Which model predicts a higher demand? Explain how you know.

d) Use technology to graph each model. Extend each graph to determine the demand after 15 years.

$y = 50(15) + 2420$
$y = 750 + 2420$
$y = 3170$

A household will use 3170 kwh of electricity in 15 years. I am 100% confident.

Apr 11-3:16 PM

5.5 Select a Mathematical Model, pages 320-331

8. Ralph is considering starting his own Web design business in his town. There are already several similar companies and he is concerned that there might not be enough business in the future. He conducted some research and determined the number of businesses with Web sites in the town seems to be growing.

Year	Number of Businesses with Web Sites
2000	256
2001	287
2002	317
2003	341
2004	368
2005	383
2006	397
2007	414

a) Create a scatter plot of the data.

b) Which model appears the most suitable: linear, quadratic, or exponential? Give reasons for your answer.

c) Develop a suitable model.

d) Predict the trend for businesses using Web sites and write a short note advising Ralph what he should do.

Apr 11-3:16 PM

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Apr 11-3:16 PM